Two north-western Queensland records of Gould's Long-eared Bat *Nyctophilus gouldi* (Chiroptera: Vespertilionidae) and evidence of cave roosting

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Gould's Long-eared bat *Nyctophilus gouldi* is widespread along the east coast of Australia from south-western Victoria to north-eastern Queensland (Parnaby 1986; Churchill 1998). The species is common throughout its range and is not considered rare or threatened in any of Australia's states and territories (Duncan *et al.* 1999). In his review of *Nyctophilus* species, Parnaby (1986) suggested that *N. gouldi* was likely more widespread in lower rainfall areas than previously realised. Young and Ford (2000) reported *N. gouldi* from central-western Queensland (Idalia National Park, 24°55'S, 144°45'E), indicating that it is distributed further inland than just mesic coastal forests along the Great Dividing Range. Similarly Gee (1999) reports a recent specimen for Gol Gol in western New South Wales (34°10'S, 142°13'E), albeit from a citrus orchard. This note reports two further western records of *N. gouldi* in northern Queensland and identifies for the first time the possibility of cave roosting.

Two specimens of *N. gouldi* were collected from harp traps during systematic survey of the Desert Uplands Bioregion (Kutt 2003). Both specimens were verified by lodgement with the Queensland Museum (QM). The first specimen (QM Voucher No. JM 12667) was recorded on 4 August 1999 at Fortuna Station, 100 km north of Aramac (22°46'38"S, 145°32'56"E). This adult male, weighing 6.6g with a forearm of 39.2mm, was in a patch of Lancewood *Acacia shirleyi* occurring in a mosaic with Silver-leaf Ironbark *Eucalyptus melanophloia* open woodlands on deep yellow sands. Other species trapped at this site included *N. geoffroyi*, *Scotorepens greyii*, *Vespadelus baverstocki* and *V. finlaysoni*, the latter two being predominantly arid-inland bat species (Churchill 1998).

The second *N. gouldi* specimen (QM Voucher No. JM14080) was recorded on the 17 April 2000 at White Mountains National Park, 60 km north of Torrens Creek (20°23'41"S, 46'54"E). Again it was an adult male with a weight of 6.9g and a forearm of 40.2mm. A second male *N. gouldi* was trapped and released at this site on the following day. Both animals were captured by harp trap, set across the mouth of a cave at the end of a steep rocky gully. The surrounding vegetation was open woodland of *Corymbia trachyphloia*, *C. lamprophylla* and *Eucalyptus mediocris*. *Vespadelus troughtoni*, *Rhinolophus megaphyllus*, *Miniopterus australis* and *M. schreibersii*, all typically near coastal cavernicolous bats, were also captured at this site.

The *N. gouldi* records reported here and in Young and Ford (2000) indicate this species is more widespread through inland Queensland than previously thought. It has been contended that some south-eastern Australian bat species, such as *N. gouldi* and *Scoteanax rueppellii,* are restricted to the narrow strip of wet sclerophyll ecotone forest directly adjacent to the extensive upland rainforests of the Wet Tropics Bioregion (Schulz 1995; Clague *et al.* 1998). However, the *N. gouldi* records reported here and elsewhere (Gee 1999; Young and Ford 2000) appear to dispute this case. Furthermore, *S. rueppellii* has been recorded in open woodlands at Dotswood Station (Williams *et al.* 1993) and the Valley of Lagoons area (unpubl data), well west of the Wet Tropics ecotone. Tall open woodlands at high altitudes (up to 1000 m) occur throughout the Einasleigh Uplands Bioregion from the White Mountains, west to Croydon and north to Lakeland. These landscapes have strong connectivity with the Wet Tropics Bioregion to the east and with the broad band of sandstone ranges running inland along the Great Dividing Range through the Desert Uplands and Brigalow Belt (Sattler and Williams 1999). This suggests that *N. gouldi* may be patchily distributed in the Einasleigh Uplands, the Desert Uplands, the Brigalow Belt and eastern Mulga Lands bioregions (Sattler and Williams 1999), where suitable habitat (e.g. hollow-bearing trees or caves) occur. The climatic constraints and hence the far northern distributional limit for this species are unknown.

The record at White Mountains is evidence that *N. gouldi* may roost in caves. Though not observed directly within the cave (the nature and shape of the cave entrance was too narrow to allow direct exploration), captures in a harp trap that covered the entrance of the cave suggest it was using it as a roost, being in the company of more typical cave dwelling bats. That two individuals were trapped, suggests that the event was not unique. *Nyctophilus gouldi* is more typically known to roost in small colonies under exfoliating bark or in hollows in trees of particular size and height (Lunney *et al.* 1988; Churchill 1998). *Nyctophilus geoffroyi* has been recorded from caves and crevices in more arid areas (Parker 1973 cited by Thomson 1989; Churchill 1998). Clague (2000) states that *N. bifax* and *N. geoffroyi* have both occasionally been found in mines though no verification of locality or specimens is provided by the author. *Nyctophilus gouldi* is reported as occurring in the Jenolan and Wombeyan Caves Reserves (Herr 2000), but it is also not clear whether it was trapped or sighted from within the caves or simply the surrounding woodland vegetation.

Use of atypical roost sites for forest and cave bats has been reported elsewhere. Schulz (1997) found a colony of over 30 *Miniopterus australis* in a tree-hollow in northern New South Wales. This species is more commonly associated with cave roosting and breeding (Churchill 1998). This suggests that though some bat species have a strong affiliation to a roost type, flexible roosting strategies may be used. Selective pressures such as roost availability, dimension, energetic considerations, season, prey availability and predation pressures drive roost choice (Kunz 1982). In the case of *N. gouldi* at the western edge of its distribution, preferred roosts (e.g. large hollow-bearing trees, Lunney *et al.* 1988) may be less available, resulting in some individuals using less preferred roost types such as caves. Alternatively, tree roosts may not satisfy the bat's physiological requirements in this hot, dry portion of its range.

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References

Churchill, S. 1998. *Australian Bats*. Reed New Holland, Sydney.

Clague C.I. 1998. The differential utilization of forest types by insectivorous bats in far north Queensland wet sclerophyll forests. *Bat Research News* **39**:30.

Clague C.I. 1998. Bats in Mines. *Australasian Bat Society Newsletter* **15**: 17-20.

Duncan, A., Baker, G.B. and Montgomery, N. 1999. *The Action Plan for Australian Bats*. Environment Australia, Canberra.

Gee, D. 1999. Range extension of the Gould's Long-eared Bat *Nyctophilus gouldi*. *Australasian Bat Society Newsletter* **13**: 25-26.

Herr, A. 2000. The bat fauna of the Jenolan and Wombeyan Caves Reserves, NSW. *Australasian Bat Society Newsletter* **15**: 29-31.

Kutt, A.S. 2003. New records of the Julia Creek Dunnart *Sminthopsis douglasi* in central-north Queensland. *Australian Zoologist* **32: 257-60**

Kunz, T.H. (1982). Roosting Ecology of Bats. Pp. 1-46 in *Ecology of Bats*, edited by T.H. Kunz. Plenum Press, New York and London.

Lunney, D. Barker, J., Priddel, D. and O'Connell, M.O. 1988. Roost selection by Gould's Long-eared Bat *Nyctophilus gouldi* Tomes (Chirpotera: Vespertilionidae), in logged forest on the south coast of New South Wales. *Wildlife Research* **15**: 375-384.

Parnaby, H. 1986. Distribution and taxonomy of the Long-eared Bats, *Nyctophilus gouldi* Tomes, 1858 and *Nyctophilus bifax* Thomas, 1915 (Chirpotera: Vespertilionidae) in eastern Australia. *Proceedings of the Linnean Society of New South Wales* **109**: 153-172.

Sattler, P. and Williams, R. 1999. (eds). *The Conservation Status of Queensland's Bioregional Ecosystems*. Environmental Protection Agency, Brisbane.

Schulz, M. 1997. *A preliminary investigation of the Golden-tipped Bat Kerivoula papuensis in the Wet Tropics*. Report to Wet Tropics Management Authority, Cairns.

Schulz, M. 1997. The Little Bent-wing Bat *Miniopterus australis* roosting in a tree hollow. *Australian Zoologist* **30**: 329.

Thomson, B.G. 1989. *A Field Guide to the Bats of the Northern Territory.* Conservation Commission of the Northern Territory, Darwin.

Williams, S., Pearson, R. and Burnett, S. 1993. Survey of the vertebrate fauna of the Dotswood area, North Queensland. *Memoirs of the Queensland Museum* **33**: 361-378.

Young, R.A. and Ford, G.I. 2000. Bat fauna of a semi-arid environment in central western Queensland, Australia. *Wildlife Research* **27**: 203-216.